

RECURRENT DISLOCATION OF THE ULNAR NERVE.

REPORT OF A SECOND CASE CURED BY OPERATION.

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IN the ANNALS OF SURGERY for November, 1903,* I reported a case of recurrent dislocation of the ulnar nerve cured by operation together with a summary of all operations reported up to that time, fifteen in number. The rarity of this condition and the small number of cases operated upon call for a report of every case. I therefore wish to give the history of a second successful operation and in addition to present a brief review of what has been written on this subject and of the cases operated on since my last paper was published.

The ulnar nerve rarely dislocates forward of the condyle of the humerus, whereas subluxation to the tip of the condyle is not infrequent. About 3 out of 200 cases will show dislocation of the nerve, but the cases in which this dislocation causes painful and disabling symptoms are much rarer. Subluxation almost never causes pain. I have been interested in this subject and have been on the lookout for such cases for the past nine years, during which time I have been on duty at least eight months of each year in a large clinic at the Massachusetts General Hospital. These two cases,—the one previously reported and the one reported below,—are the only ones which have come under my observation, and so far as can be discovered are the only ones in the records of this hospital.

* Report of a case of recurrent dislocation of the ulnar nerve cured by operation. With summary of previously reported cases.

The recurring dislocation of the nerve on flexion of the elbow, may be a congenital or habitual condition which does not lead to annoying symptoms. In these idiopathic or non-traumatic cases the dislocation is seldom accompanied by sufficient symptoms to demand operation. If symptoms do appear they yield to palliative treatment in most instances. In the few cases operated upon only two have been the congenital or habitual forms; in all the other operated cases the symptoms have resulted from trauma. The kind and degree of trauma to the region of the elbow causing the lesion are various. Direct violence, such as contusion and hæmatoma of the soft parts, has been followed by recurrent dislocation; indirect violence, such as exercising on a parallel bar or throwing a snow ball, has been sufficient to tear up the fibrous structures normally tying down the nerve and permit of the abnormal mobility. Diffuse suppuration around the elbow, also has been followed by dislocation.

The majority of the cases operated upon have followed more or less severe direct violence either from blows or falls. My first case struck the inner side of the left elbow violently against a post, without, however, any bony fracture, about a month before symptoms due to dislocation of the nerve appeared; my second case, reported below, followed a septic wound at the inner side of the elbow and an incision for drainage of a large collection of pus. A case reported by Croft was also that of a young woman with septic infection in the region of the elbow following an injury.

The characteristic symptoms are severe darting pain at the region of the elbow into the distribution of the ulnar nerve in the hand. Numbness and tingling in the inner fingers of the hand may be present all the time, but flexion of the forearm causes a severe shooting pain from the elbow into the fingers. In both my cases flexion and extension of the forearm caused pain referred to the internal condyle of the humerus and inner side of the forearm and the two inner fingers of the hand. There was no loss of sensation in the region supplied by the ulnar nerve, the strength of the hand

was good and there was no muscular atrophy. There was entire disability for any form of work necessitating the use of the affected arm.

It is the accepted theory of nearly all who have reported cases of this condition that the darting pain along the course of the nerve is caused by the trauma of the oft-recurring excursions or jumps over the tip of the internal condyle, and that in a comparatively short period of time pathological changes in the nerve and its sheath take place. In most of the cases operated upon the nerve was found to be distinctly enlarged and fusiform in shape. The only case in which a microscopic examination of the nerve structure has been made was in the case of Andrae, which was summarized in my previous paper. Acting on the theory that the dislocation was due to the excessive length of the nerve caused by stretching Andrae excised the fusiform enlargement and sutured the ends of the resected nerve together. Examination of the excised piece showed a typical neurofibroma with marked thickening of the nerve sheath.

For a complete review of the subject as well as abstracts of cases reported previous to 1903 the reader is referred to my previous paper, also to the articles by Poncet, Haim, Schwartz, Rosenbach, Jopson, and Cotton, references for which are given in the bibliography at the end of this paper.

My first case was that of a man fifty-two years old. He was operated upon in 1900. Dislocation followed a blow as stated above. He had been disabled for six months. At operation the groove back of the internal condyle, in which normally the nerve should rest, was filled by muscle-fibres,—evidently a portion of the triceps. The nerve could be easily moved about between the points where it emerged from the intermuscular septum and passed between the two heads of the flexor carpi ulnaris. It was fusiform in shape and as large as a lead pencil in its thickest portion. There was no strong band of fascia passing over the nerve, the so-called arcuate ligament. It was evident that at the original injury the fibrous and muscular structures back of the condyle had been torn

or ruptured and in the process of repair the bony groove had been filled up with muscle-fibres.

The groove was cleared and the nerve replaced and a flap from the triceps fascia sutured over it to the fascia covering the flexor muscles. I have heard from him within a few weeks, eight years after the operation. He has remained absolutely free from any of the symptoms and has been able to engage in his occupation as lumberman.

REPORT OF THE SECOND CASE.—M. H., a young Irish-American woman, twenty-two years old, single, domestic servant by occupation, was first seen by me early in June, 1906, in the out-patient department of the Massachusetts General Hospital. She was kept under palliative treatment for two months before it was decided to operate. Her previous history was as follows: In 1904 she had been an inmate of the hospital because of accidentally swallowing a large safety-pin. This was removed successfully by Dr. Algernon Coolidge. One year before she came under my notice she had received a small lacerated wound at the inner side of the right elbow, which became infected and suppurated extensively for weeks. She was treated for this in the out-patient department. Soon after the infected wound healed she began to be troubled by numbness and pricking sensations in the fourth and fifth fingers of the right hand and shooting pain along the inner side of the right forearm starting from the elbow and continuing into the fingers of the hand. These symptoms at first did not bother her to any extent when she kept the arm still, but any motion involving flexion of the forearm at the elbow started up the severe pain. She had had an operation for the relief of these painful symptoms, which operation, so far as could be found out, consisted of dissecting out the scar of the old incisions for drainage, presumably on the theory that the symptoms were due to pressure upon the ulnar nerve. No relief was obtained from this treatment.

It was evident that the attendants in the clinic considered her complaints of pain as feigned, and I was informed that she was an old hysterical case and everything had been done that could be done for her symptoms, which were doubtless imaginary.

Examination showed a well-developed and nourished young

woman not markedly neurotic in appearance or conduct. The pupils were equal and reacted normally. There was nothing abnormal found in the heart, lungs or abdomen. There was a slight enlargement of the thyroid gland. Knee-jerks were normal. The right elbow was held in semi-flexion. Motions of the joint were possible, both flexion and extension, but caused complaint of severe pain at the inside of the elbow darting along the inside of the forearm and into the hand. On the inside of the arm over the course of the ulnar nerve was a wide dense scar about four inches long. The lower end of the scar was about two centimetres above the internal condyle of the humerus. The scar was readily movable over the underlying tissues. The ulnar nerve could be felt, with the arm in extension, in its groove back of the condyle, upon flexion it dislocates well forward of the condyle. The nerve was evidently enlarged and could be felt to the upper and outer side of the scar on the arm and could be traced for at least an inch and a half further than in normal arms. Pressure upon the nerve back of the condyle, and also where it was exposed under the skin upon the arm, caused extreme pain at the site of pressure and referred pain into the fingers.

There was no disturbance in sensation in the ulnar distribution in the hand nor was there evident loss of strength in the hand or muscular atrophy. Because of the suspicion of neurasthenia in the case, although the symptoms and signs of nerve dislocation were sufficiently plain, I was persuaded to try palliative treatment for a longer time than usual. The arm was put on an internal right-angled splint for three weeks. While it rested on the splint there was no acute pain, but some prickling sensations and numbness in the fingers persisted. At the end of three weeks upon removing the splint there was just as much pain, both local and referred, upon pressure and attempts to use the arm caused severe pain. It was impossible for her to use a broom in sweeping or to do any household work which called for flexion of the forearm at the elbow. A second period of rest for three weeks made no change in the conditions. At the end of two months' palliative treatment I became convinced that this was a case of actual disability from recurrent dislocation of the nerve, and also that it was a case in which, because of extensive suppuration and previous operation, the nerve had even more freedom than is found usually. The movement of the nerve in the arm, as the forearm was flexed, was marked. Either by the suppuration or previous

operation the nerve had been freed from its normal place under the aponeurosis of the triceps and was subcutaneous for an abnormal distance. Accordingly I operated upon the patient on the 15th of August, 1906.

The old scar was dissected out and it was found that the nerve was exposed for a distance of about two inches above the groove in the condyle and at the point where it entered the aponeurosis over the triceps muscle it was bound down firmly by scar-tissue. Between this point and the groove it was enlarged, reddened and freely movable. The fibrous tissues normally pinning the nerve down into the groove behind the condyle were not defined, a condition which meant that with every flexion of the forearm the nerve was displaced forward over the condyle and also pulled upon at an acute angle where it emerged from the intermuscular septum.

The nerve was buried as nearly as possible in its normal position by making a new fibromuscular canal, suturing the nerve under the fibres of the triceps muscle and also turning over a flap from the aponeurosis of the triceps and suturing it to the fascia over the flexor group. The wound was closed without drainage and the arm put up on an internal right-angled splint. At no time after the operation was there complaint of pain. The splint was removed at the end of three weeks and active and passive motion begun without bad result.

I saw the patient over a year after the operation. She has been at all times free from pain and disability, has married and is able to do her own housework.

Emil Haim (Ueber Luxation der Ulnaris, *Deutsche Zeitschrift für Chirurgie*, Leipsic, 1904, lxxiv, 96) reported two case, one operated on by Lotheisen and one case of Von Hacker personally communicated to Lotheisen, a case operated on at the Innsbrücker clinic. Haim in common with certain other German writers discusses at some length the question of a predisposing cause in the non-traumatic cases. He thinks that the dislocation is never congenital and that a predisposition exists. He, as well as Cohn, advances a new theory which is worth mentioning, although it is hard to attach much importance to it as the cause of the dislocation. He places great

stress on the carrying angle at the elbow, that is, the angle which the forearm makes with the humerus in extension, the *cubitus valgus*, and he thinks it has been proved by a study of many patients that this angle is less in those cases in which the ulnar nerve dislocates. He found in men with normal ulnar nerves that this angle was from 170 to 178 degrees; in women 165 to 175. In the cases in which the subluxation or dislocation of the nerve was present the angle was about 5 degrees less.

The case of VON HACKER is of special interest because of the dislocation of the nerve caused by tuberculosis of the internal condyle. The progress of the disease pushed the nerve forward out of its normal position permitting recurrent dislocation with the typical pain and disability. After dissection of the epitrochlear glands and removal of some diseased bone, the nerve was sutured under a bridge of fascia, with an excellent result so far as the relief of the pain was concerned. No other details of this case are given.

LOTHEISEN'S case was one of traumatic dislocation of the *right ulnar nerve* following a blow on the elbow. Operation and recovery. Two years after, operation on the *left nerve* for the same condition. School boy, sixteen years old. No previous trouble in the region of either elbow-joint. Five days before fell, striking on right elbow. Immediately felt severe pain in the elbow and darting pains into the two inner fingers of the right hand. The painful symptoms persisted.

Examination: Normal in every way except in regard to right elbow. The ulnar nerve could be felt as a distinct cord forward and inside of the epicondyle, and pressure on this cord caused severe pain at the elbow and into both inner fingers of the right hand. Upon extension of the forearm the nerve returned to its normal situation. It was noted that the left nerve was somewhat freely movable,—that is to say, there was subluxation. X-ray photographs showed that on both sides the epicondyles were normal and even larger than usual. On both sides there was a marked *cubitus valgus*. The measurement of the carrying angle was 165 degrees.

Operation December 15, 1902. Ethyl chloride anæsthesia. A straight incision over the internal condyle. The nerve appeared normal. It was placed in its groove and a flap of fascia sutured by four silk stitches to the periosteum and edge of the bone,—how is not stated. Skin wound closed without drainage. Arm put up on a splint in extension. After ten days some careful passive motion of the joint, and after fourteen days the arm placed upon a right-angled splint. At the end of three weeks the patient left the hospital without pain. Seven weeks after the operation he was well. (Note the early date at which motion of the elbow was attempted.)

A second operation was done by Lotheisen on this same patient on the other elbow July 14, 1904, about two years after the first injury. While at work suddenly felt a sharp pain in the left elbow and left hand exactly similar to what he had had on the right. By self-examination he noted that the nerve dislocated on each flexion of the forearm. Examination discovered typical dislocation as at the other elbow. A similar operation was done save that the flap of fascia was sutured over the nerve to the edge of the triceps muscle. No after-treatment or result is given, except that on flexion the nerve remained fixed in its normal position.

Rosenbach (Ueber die Luxation des Ulnarnerven, *Deutsche Zeitschrift für Chirurgie*, Leipsic, 1906, lxxxv, 300) from the polyclinic in Göttingen reported a successful operated case and gave a concise review of the subject. In regard to the frequency of complete dislocation he gives the observation of the following men: Raymonenq found no case in 300 persons; Kissinger, 1 case in 200; Haim, no case in 350; and Momberg found 23 cases in 116, all in soldiers. Subluxation of the nerve is not infrequent. Kissinger found this in about one-third of the cases.

In my previous paper I stated that in a series of 150 large and well-developed men I found only 1 case of complete dislocation, but that in over one-third of the cases subluxation was present. These subluxations are not infrequently bilateral and almost never cause painful symptoms. Almost all the German and French writers give a good deal of space to the reasons for complete dislocation of the nerve. The practical points are that there must be some predisposing reason for the dislocation in those cases in which traumatic causes can be eliminated. The connective-tissue fibres from the aponeurosis, the so-called arcuate ligament which binds the nerve down in its groove may be weaker and looser in some persons than in others. This may be a congenital defect or due to conditions of ill health or emaciation. The triceps muscle may be larger than usual and take its insertion lower down so that on flexion of the forearm there is more of the bulging of the muscle tending to push the ulnar nerve out of its place. Again the condyle of the humerus may be smaller and less prominent in certain individuals. Fortunately in all but two or three of the non-traumatic cases of complete dislocation no

operation has been necessary and in those cases in which temporary painful symptoms have been present these have yielded readily to palliative treatment. The serious cases, those demanding operation, are usually the ones in which some definite trauma is the cause, either a blow or some violent motion of the elbow-joint.

Report of ROSENBACH's Case.—A strong woman, eighteen years old, after exercising on a horizontal bar noticed that she could not move her right arm at the elbow without great pain. Applied ice and iodine, and had massage. Wore plaster of Paris bandage for two weeks. On examination complete dislocation of the ulnar nerve was found, with characteristic pain.

Operation seven weeks after the first symptoms discovered that the nerve was enlarged and reddened. The nerve was fixed in its groove by the following method: The groove in the bone was deepened by a gouge before the nerve was replaced. After this a flap of fascia from the triceps was sutured over the nerve to the fascia over the insertion of the flexor group. His reason for gouging out the groove was that he was afraid it would require too great force to hold the nerve in place. No details of the after-treatment are given. The operation cured the patient.

HOLM, A. (Et Tilfælde af Luxatio traumatica nerv. ulnaris., Hosp. Tid., Kbenh., 1906, 4 R. xiv, 461-468), reported a case operated on in Poulsen's clinic in Copenhagen, November 28, 1905, as follows: Case of a carpenter, seventeen years old. At eight years of age had dislocation of the elbow; at end of half a year all motions good, no further trouble. Ten days before entering clinic while flexing the forearm was struck a blow which knocked the inner side of the elbow against a table. There was immediate characteristic pain at the elbow, shooting into the finger, with increasing pain and disability. Poulsen used a small flap from the periosteum as well as a flap from the aponeurotic structures, suturing over the nerve with catgut stitches. The arm was put in extension, fixation bandages. In three weeks nerve held firmly in place, joint motions normal. There was no more pain, but on extreme flexion of the elbow there was a slight grumbling sensation in the fingers.

G. Tisserand (Luxations du nerf cubital, Arch. gen. de méd., Paris, 1906, 1, 86-91) is opposed to this method, which covers the nerve with a periosteal flap. He thinks that in this there is danger of pressure on the nerve ultimately, especially in young persons, from proliferation of bone; the flap from the aponeurotic structures is all that is necessary. In this opinion I agree entirely.

BLANC and TISSERAND (*Un Cas de Luxation du Nerf Cubital*, La Loire Méd., St. Étienne, 1905, xxiv, 27-30) have reported one operated case as follows: Workingman, seventeen years old. Two months before in making a violent effort to lift a heavy weight from the ground, felt sudden pain in the left elbow at the moment of flexion of the forearm, "as if a nerve was torn." For the next month and a half each movement of flexion of the forearm caused pain which was not severe or disabling until fifteen days before operation, when the severity and the weakness in the hand compelled him to give up work. Nothing is said about the distribution of the pain into the hand at this time.

Examination: The region of the elbow showed no wound or abnormality when the forearm was extended. The motions of the joints were normal. In flexion it was noticed that when the forearm was brought to a right angle on the arm one could see in bold relief under the skin a cord jump suddenly from the posterior to the anterior face of the epicondyle. At this time the patient complained of lively pain along the internal border of the forearm and in the elbow-joint. Pressure on the displaced cord caused severe pain in the forearm, radiating into the ring finger and little finger. On palpation the groove back of the condyle was found empty. On extending the forearm the nerve was seen to jump back suddenly to its posterior position. There was no anesthesia in the nerve distribution and no muscular atrophy. The electrical reactions were normal. The ulnar groove was filled with fibrous tissue. This was removed and the nerve put back in the groove and fastened by a small flap of fascia from the aponeurosis which was sutured to the triceps muscle. Skin sutured without drainage and arm fixed in extension. Union by first intention. No pain since operation at any time. (Note.—On the tenth day passive motion was made and the forearm put up in half flexion, and in eighteen days brought up to a right angle and at each change of position passive motion of the elbow-joint was done.)

The man was discharged cured December 20th, just a month after operation. All the movements of the forearm were free and without pain. The ulnar nerve remained in its groove. This patient had a persistent zone of hyperesthesia in the distribution of the ulnar nerve along the border of the ring finger and the hypothenar eminence.

Up to 1904 only 15 operations for this condition had been reported. Abstracts of these cases together with a report of my first case were given in the previous paper, 16 cases in all. Since 1904 it has been possible to find only 6 additional cases with my second case now reported, bringing the total number of operations to 23. A study of these cases justifies the following conclusions:

Operation for this condition has every chance of effecting a cure. Only the severe cases, few in number and for the most part traumatic, need ever be operated upon.

Operation should never be undertaken for dislocation of the nerve alone, but only for the severe and disabling symptoms caused by the recurring dislocation.

The simple operation of replacing the nerve in its groove and covering it over with a flap of fibrous tissue from the triceps fascia will be sufficient to hold it firmly in place. More elaborate operations of chiselling the bone or dissecting up periosteal flaps are unnecessary.

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